THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
OFFICE OF COASTAL ZONE MANAGEMENT
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August 2, 2006

Dear Concerned Member of the Public:

It is hard to ignore coastal hazards in Massachusetts, especially when an above normal hurricane season has been predicted for Southern New England and the private insurance industry is raising premiums and pulling policies for coastal homes. Since the Coastal Hazards Commission began meeting in February, we have been discussing these and other issues related to coastal hazards including sea-level rise, erosion, flooding, and failing seawalls that threaten coastal communities and ecosystems. The goal of the Commission is to review existing coastal hazards practices and policies, identify data and information gaps, and draft recommendations by November for possible administrative, regulatory, and statutory changes. This has been a challenge in such a short timeframe considering Massachusetts has over 1,500 miles of diverse coastline.

Five working groups of experts have been assisting the Commission with our recommendations. The experts represent various fields including policy, planning, emergency management, biology, geology, and engineering. The working groups have focused on (1) coastal hazards data and tools, (2) policies, (3) planning and regulations, (4) structural measures to protect coastal development, and (5) public coastal infrastructure. While the Commission continues to work hard on these issues, we are providing a draft of our recommendations for your review.

The Commission requests your feedback now through September 15 on our draft recommendations. Please let us know if the recommendations cover all of the critical issues related to coastal hazards in Massachusetts. The Commission will prioritize the recommendations and provide plans for implementation in the final report, which will be released in November. If you have any suggestions on prioritization or implementation, those comments are welcomed as well.

Thank you for your interest in the Coastal Hazards Commission. Our draft recommendations and additional information about the Commission can be found on CZM's website, http://www.mass.gov/czm/chc/index.htm. We look forward to reviewing your comments. Please send them to the attention of Julia Knisel at coastal.commission@state.ma.us or 251 Causeway St., Suite 800, Boston, MA, 02114-2138.

Sincerely,
Susan Snow-Cotter
Chair, Coastal Hazards Commission
Director, CZM

Coastal Hazards Commission
DRAFT Recommendations for Public Comment
August 9, 2006

HAZARDS INFORMATION

I. COASTAL HAZARDS COMMISSION OUTREACH

A. *This recommendation extends to all working group areas.*

- ❖ Develop a comprehensive coastal hazards outreach strategy for the public and decision makers.

II. EXISTING COASTAL HAZARDS INFORMATION UPDATE

A. *Successful coastal hazards assessment, planning, management, and mitigation require accurate data on flood and storm-damage risks. The Flood Insurance Rate Maps (FIRM) are used to represent these risks, however the average age of an effective FIRM panel in Massachusetts is now 19.9 years and the study data used to create these panels is typically several years older. Federal Emergency Management Agency (FEMA) funding allocated to Massachusetts under their Map Modernization Program is insufficient to properly update the maps, providing only $6 million as compared to the need of $34 million estimated in the Massachusetts Map Modernization Business Plan. The Commonwealth should follow the lead of other states and partner with FEMA to update coastal FIRMs in Massachusetts. By providing financial and technical assistance, the partnership would help FEMA leverage funding to update FIRMs according to FEMA's guidelines and specifications.*

- ❖ Assist the Federal Emergency Management Agency financially and technically to update and maintain Flood Insurance Rate Maps in the coastal zone of Massachusetts. (*high priority recommendation of working group*)

III. NEW DATA COLLECTION AND MONITORING OF COASTAL HAZARDS

A. *As part of a larger effort to provide municipal Conservation Commissions with guidance on coastal hazards, a Coastal Hazards Characterization Atlas has been compiled for the South Shore of Massachusetts. The purpose of the Atlas is to present information that can aid in the review of proposed projects in areas that may be vulnerable to coastal hazards. The Atlas will assist local reviewers with the identification of technical information necessary to evaluate individual projects and implement sound coastal hazard mitigation strategies. The following variables were mapped at a sub-regional scale: dominant coastal processes, storm damage susceptibility, properties with multiple National Flood Insurance Program (NFIP) claims, shoreline change rates, littoral cells, coastal engineering structures, and relative sea level rise. It is recommended that the Commonwealth provide funding to the Office of Coastal Zone Management (CZM) to compile a Coastal Hazards Characterization Atlas for each of the four remaining coastal regions. The*

average projected cost for each region is $112,500, for a total of $450,000. Based on current storm damage issues, the Atlases should be completed as follows: North Shore, South Coast, Cape Cod and Islands, and Boston Harbor. All of the atlases will be posted online.

- ❖ Compile a Coastal Hazards Characterization Atlas for each of the four remaining coastal regions of the Office of Coastal Zone Management. (*high priority recommendation of working group*)

B. *A Risk and Vulnerability Assessment Map (RVAM) is needed by each coastal community to show the relationship between coastal hazards and vulnerable factors, and serve as the basis for a vulnerability assessment, as well as effective and efficient hazard mitigation and emergency response planning. Many coastal communities have not developed RVAMs because they do not have the technical expertise or funding. A standardized Geographic Information System (GIS) methodology should be developed and utilized in the production of each RVAM. At a minimum, each RVAM should identify the following: critical facilities and infrastructure, erosion and flood-hazard areas, evacuation routes, and transportation infrastructure. To understand and address potential socio-economic threats to the communities, it would be beneficial to include local zoning, property boundaries, and valuation data on RVAMs.*

- ❖ Develop a Risk and Vulnerability Assessment Map for each coastal community using a standardized methodology. (*high priority recommendation of working group*)

C. *The coastal zone is being severely impacted by erosion and flooding due in part to climate change and sea-level rise. It is likely that this impact will increase in the future as the rate of sea-level rise continues and likely accelerates. Additional shoreline change and inundation data are needed to plan for and manage current and potential future impacts of sea-level rise. The Commonwealth should support efforts by the United States Geological Survey (USGS) and others to map the current and future vulnerability of coastal areas to erosion, inundation, and storm flooding using Light Detection and Ranging (LIDAR) data and dynamic coastal geomorphic modeling. These data and information will be useful to a wide range of organizations for both short and long-term planning.*

- ❖ Map and model climate change and sea-level rise data related to coastal hazards in Massachusetts.

D. *Post-storm coastal conditions need to be collected immediately to capture the nature, magnitude, and spatial variability of changes due to major storms. High-water marks should be flagged by the Massachusetts Rapid Response Coastal Storm Damage Assessment Team (Storm Team) during their assessment of storm damage to preserve the shoreline indicators. Licensed surveyors can map the location of these flags after the storm. The*

Commonwealth should also make arrangements with the United States Army Corps of Engineers (USACE), USGS, and others to collect aerial photos and LIDAR data within in a week of major storms. These data will be used for disaster recovery and erosion mitigation as well as to refine predictive storm models.

- ❖ Develop a process to capture coastal conditions immediately after major storm events.

E. *The public and decision makers need to be aware of the potential losses associated with various storm events. Models, such as HAZUS, should be used to produce estimates of physical, economic, and social impacts due to floods and winds. Wind data for the Hurricane of 1938 has already been modeled using HAZUS.*

- ❖ Model potential storm damage based on historical event data to educate the public and decision makers to the magnitude of our current risk in the coastal zone.

IV. Education and Outreach of Coastal Hazards Information

A. *Many organizations produce coastal hazards information, however, the information often does not reach its intended audience because they are not informed that it exists and it is not easily accessible. Organizations should post their information online and focus on outreach to inform potential users of the availability of new data and tools. A comprehensive list of coastal hazards information is necessary to direct people to the range of data and tools, and inform them about the purpose and timeframe of the information. This list should be compiled and posted online as a searchable portal to the information. (A preliminary list will be provided by the working group.) Contact information for technical staff that can assist with coastal hazards information should be posted on the portal. The portal also should be publicized and updated as new information becomes available.*

- ❖ Create and maintain an online portal to resources, websites, and data sharing systems that distribute coastal hazards information including data and tools. (*high priority recommendation of working group*)

B. *The Commonwealth should evaluate whether citizens are adequately informed about coastal hazards before and during storm events. Evacuation information and route changes especially need to reach people during power outages.*

- ❖ The Commonwealth needs to evaluate the distribution of regional coastal hazards and emergency management information to coastal communities before and during storm events. This should include ways to ensure that the public is kept informed with up to date and accurate hazard information and actions government officials are requesting the public to take. It could include use of various electronic

mediums (broadcast media, emergency alert system, websites/portals, highway signs/radio, etc.), public outreach forums, distributed literature, and targeted high risk populations/locations.

POLICY

I. HOMEOWNERS INSURANCE

A. *The availability of private homeowners insurance in coastal Massachusetts has reduced significantly since 2003. Revised catastrophe models that predict extremely high risks of wind damage along the Massachusetts coast contribute to increased reinsurance rates. As a result of the rise in predicted risk and cost of reinsurance, private insurance companies have raised their rates and in many cases restricted coverage from coastal areas. Many of these coastal policies have been placed in the Massachusetts Fair Access to Insurance Requirements (FAIR) Plan.*

The Massachusetts Property Insurance Underwriting Association (MPIUA) through the Fair Plan provides coverage to property owners who can not obtain it in the voluntary insurance market. Policies must be approved by the Massachusetts Division of Insurance (DOI), but losses are shared among member companies of the MPIUA on a premium volume basis. The number of Fair Plan policies on Cape Cod and the Islands increased 237% between December 2003 and June 2005, while policies in the remaining areas of the state only increased 30%. Homeowners who have had policies canceled or not renewed by their insurers, specifically those who have paid off their mortgages, are also choosing to go without insurance due to the great expense of coverage.

Insurance companies and coastal homeowners are protected to some degree by the Massachusetts Insurers Insolvency Fund (MIFF). MIFF or the Guaranty Fund is a nonprofit, unincorporated legal entity that covers claims up to $300,000 when insurers become insolvent. Insurers are assessed up to 2% of total premiums to pay obligations and other costs of the Guaranty Fund. DOI also has authority over the Guaranty Fund.

- The Massachusetts Division of Insurance should:

1. Provide additional outreach to coastal homeowners who are covered by insurance to ensure that they understand what their policy covers, and uninsured coastal homeowners to explain the importance of insurance.

2. Explore the feasibility of working with insurance agencies and realtors to encourage homeowners to retrofit homes (using readiness checklists) to be more storm resistant in exchange for reduced insurance deductibles or other incentives.

3. Increase the Guaranty Fund's $300,000 maximum coverage and/or consider generating a sliding maximum based on changing conditions.

II. EXECUTIVE ORDERS AND INTER-AGENCY COORDINATION

A. *There are several state agencies charged with managing various aspects related to the state's use of coastal areas. While there is communication between agencies, separate agency charges often make it difficult to effectively coordinate efforts and timelines. The implementation of some state executive orders, including 149 and 181, would improve with more effective inter-agency coordination.*
Both executive orders were intended to reduce vulnerability to coastal hazards and especially to reduce damage costs. Executive Order 149 provides guidance on the general use and development of the state's floodplains. Executive Order 181 provides Massachusetts with guidance specifically for development and management of barrier beaches. A draft guidance document that addresses portions of Executive Order 181 and Executive Order 149 was developed by CZM. The guidance document will provide the basis for consistent implementation and a simple tool to coordinate agency action.

- Office of Coastal Zone Management and Massachusetts Department of Environmental Protection should update and finalize the guidance document for state and local agencies on how to implement Executive Orders 149 and 181 relative to publicly funded infrastructure projects. Guidance regarding the remaining portions of Executive Order 149 should also be developed by the agencies.

III. VOLUNTARY LAND ACQUISITION TOOLS FOR STORM-PRONE PROPERTIES

A. *Many properties along Massachusetts' coastline are vulnerable to storm damage. There are costs associated with the damage, which are born by the state as well as communities and residents. By acquiring these storm prone properties from willing sellers, future costs are avoided and benefits are gained. Public acquisition of coastal land is beneficial for recreation, habitat protection, access to the coast, and in some cases protects the quality and quantity of ground water as well.*

Massachusetts has several land acquisition programs at the state and local level. While all of the state's programs are authorized to acquire vulnerable coastal properties, that is not necessarily their primary purpose. However, acquisition of certain key coastal properties can meet the needs of the respective program while also mitigating coastal hazards. While land acquisition is one tool to prevent development in storm prone areas, this tool should not replace other options such as zoning or building codes.

- ❖ The Department of Fish and Game and the Department of Conservation and Recreation should acquire storm prone properties when feasible by revising current criteria in agency policy (or state regulations) to promote coastal land acquisition from willing sellers in fee or through conservation restrictions and easements.

B. *There are several ways for towns to acquire storm prone properties. The Community Preservation Act (CPA) is funded with community property taxes and one of the fund's accepted uses is the acquisition and preservation of open space. By voting to adopt CPA, communities will gain the authority to control planning decisions in addition to the acquisition of storm prone properties. By choosing to acquire storm prone property, risk of property damage as well as associated social and environmental costs are reduced.*

- ❖ The Community Preservation Coalition should educate communities about their abilities to acquire storm damaged properties using the Community Preservation Act or other available sources of funding. Encourage towns to adopt the Community Preservation Act to fund acquisition of storm prone properties.

IV. Storm-Resilient Communities Program

A. *Mitigation is much more cost effective than paying for storm damage after the fact. Adopting smart growth practices is one way for communities to mitigate hazards and become more storm-resilient. However, many local governments do not have the capacity to implement the comprehensive planning that goes into adopting smart growth practices.*

Often a municipality can find the capacity if a successful example is available to demonstrate that their efforts will be effective and ultimately save time and money. The state would choose communities, via a competitive process, that provide good opportunities to demonstrate successful planning and implementation approaches through a competitive process and supply them with time, funds and guidance to become more storm-resilient.

- ❖ Executive Office of Environmental Affairs agencies should work closely with a few municipalities with serious repetitive loss histories and catastrophic risk to establish a Model Storm Resilient Communities program to demonstrate the effectiveness of comprehensive planning and implementation.

Planning and Regulations

I. Coastal Hazard Mitigation Planning

A. *Coastal communities throughout the state are at different stages of coastal hazard mitigation planning. An effort should be made to ensure that each coastal community develop or update its hazard mitigation plan and*

implement it to help minimize damage from future storm events. Development and implementation of hazard mitigation plans will also help communities participating in the Community Rating System (CRS) earn points toward flood insurance premium discounts for those residents involved in the NFIP.

Communities should be encouraged to coordinate with and build upon existing efforts on the local, regional, state, and federal level. Hazard mitigation plans should include smart growth principles and consider the impacts of climate change related sea-level rise. To promote the implementation of the recommendations coming out of the coastal hazard mitigation plans, communities should be encouraged to participate in CRS, and should specifically be encouraged to develop RVAMs as part of each community's CRS efforts. CRS is part of the NFIP, administered by FEMA. CRS is a voluntary program whereby communities opt to do specific flood protection activities within four categories: (1) Public Information, (2) Mapping and Regulations, (3) Flood Damage Reduction, and (4) Flood Preparedness. Communities receive credit points for the activities they perform; and the total number of credit points a community earns determines the discount its residents receive on their flood insurance premiums. Discounts range from 5% to 45% of the premium. Participation in CRS may make communities eligible for grants to fund the hazard mitigation projects recommended in the coastal hazard mitigation plans.

Presently, only 15 communities in Massachusetts participate in CRS. The new Coastal Hazards Characterization Atlas from CZM will be useful in defining regional problems and identifying communities that can work together to develop and implement common CRS activities. Even with the Hazards Atlas, however, identifying and implementing CRS activities can be time and resource-intensive.

To ensure that these coastal hazard mitigation plans are developed and that communities participate in CRS, the state should consider funding new staff positions dedicated to this goal. These new staff positions could be located in each of the CZM regions. As an alternative, the state should also consider a one-to-one match with coastal communities to assist with the cost of plan implementation. Communities that have developed coastal hazard mitigation plans should be eligible for state funding to assist with implementation of those plans.

- ❖ <u>The state, through the Massachusetts Emergency Management Agency, the Department of Conservation and Recreation, and the Office of Coastal Zone Management, along with other appropriate planning agencies, should continue to encourage coastal communities to develop, update, and implement coastal hazard mitigation plans. Funding should be secured to obtain the technological tools and staff needed to oversee plan development and implementation in coastal communities throughout the state.</u>

II. COORDINATION OF PROJECT REVIEW

A. *The Board of Building Regulations and Standards is currently updating the State Building Code. The standards of the International Building Code are the starting point for consideration of potential revisions. In its update, the Board of Building Regulations should explore coastal construction options, consider mechanisms to address incremental renovations and expansions, and encourage the use of strategies to maintain the form and function of natural resources.*

The Board of Building Regulations and Standards, Massachusetts Department of Environmental Protection (MassDEP), and CZM should encourage local Building Inspectors and Conservation Commissions to work together to provide understandable advice to homeowners and commercial property owners about what can and cannot be built on coastal lots. The Board of Building Registration, MassDEP, and CZM should also encourage and support the joint training of Conservation Commissions and Building Inspectors for integrating resource protection and building requirements on coastal properties.

- ❖ <u>The Board of Building Regulations and Standards should update the State Building Code requirements for coastal construction, and also encourage collaboration between Building Inspectors and Conservation Commissions.</u>

B. *Many towns are set up so that a person seeking to build a structure in a coastal environment must deal with all relevant regulatory bodies independent of each other. This approach is typically time-consuming and confusing for the prospective builder. Moreover, there is often little communication between the various permitting authorities with regards to the project, allowing for certain permits to be issued for projects before other issues are addressed. In essence, this lack of coordination not only allows for incomplete project review, but also promotes the inefficient use of resources.*

Coastal municipalities should coordinate the project reviews of their various departments either formally through a process set forth in by-laws or through a more informal process of coordination. For example, in some municipalities, the Town Manager requires coordination between departments and uses a checklist to ensure that a proposed project is reviewed by the zoning board, board of health, conservation commission, planning board, fire department, and historical commission before permits are issued. Those departments with jurisdiction over the project have the opportunity to meet in a "Development Review Team Meeting" to decide how best to proceed in terms of the different requirements of each department. Coordination can result in a more streamlined process for the applicant and facilitate resolution of the issues of the various departments involved. One specific topic that would benefit from more guidance from MassDEP and at the municipal level in terms of coordination of project review is that of repairing septic systems in

vulnerable coastal areas. In addition, MassDEP, CZM, and various local permitting authorities including Conservation Commissions and Planning Boards should work together to encourage the use of Low Impact Development techniques to preserve the flood control and storm damage prevention functions of coastal resources.

- ❖ Coastal towns should explore informal coordination processes or the modification of their bylaws to provide for the coordination of permitting and approval by local departments. This coordination should promote more complete and comprehensive understanding of a project and any related permits.

III. LAND SUBJECT TO COASTAL STORM FLOWAGE

A. *Coastal velocity zones (V-zones) and other high risk areas (A-zones) of Land Subject to Coastal Storm Flowage (LSCSF) are subject to hazardous flooding, wave impact, and, in some cases, significant rates of erosion as a result of storm wave impact and scour. V and A-zones in coastal areas are generally subject to repeated storm damage, which can result in loss of life and property, increasing public expenditures for storm recovery activities, historic taxpayer subsidies for flood insurance and disaster relief, and increased risks for personnel involved in emergency relief programs. Alteration of land surfaces in A-zones could change drainage characteristics that may cause increased flood damage on adjacent properties. Currently, performance standards have not been established for LSCSF in the Wetlands Protection Act regulations.*

MassDEP should work with a balanced group of stakeholders to evaluate the need for and feasibility of performance standards or best management practices for LSCSF. The performance standards or best management practices should address the flood control and storm damage prevention functions of LSCSF. MassDEP, after receiving input from stakeholders, shall make any recommendations to the Executive Office of Environmental Affairs (EOEA) on LSCSF within 90 days of initiating this review.

A CZM fellow from the National Oceanic and Atmospheric Association (NOAA) is available to assist with this effort.

- ❖ Evaluate the feasibility of a guidance document or revisions to the Wetland Protection Act regulations to develop best management practices or performance standards for "Land Subject to Coastal Storm Flowage."

IV. INFORMATION SHARING

A. *Municipal decision-makers, coastal managers and the public should keep current with advancements in technology and coastal management strategies by interacting with colleagues at an annual coastal conference in Massachusetts. The general public should be encouraged to attend these annual meetings in order to increase public awareness and support to address and prevent coastal hazards. A better public understanding of coastal resources and hazards is necessary to implement all of the recommendations presented herein. The proceedings from the conference should be transcribed or recorded to allow easy public access. While some of the conference's expenses can be offset with in-kind donations, additional financial resources need to be secured in order to develop and execute a successful program, secure keynote speakers, and attract a broad audience. Potential partners for the conference include the Sea Grant Program, the University of Massachusetts Boston, a Massachusetts Chapter of the Floodplain Managers Association (which would need to be developed), or the Massachusetts Association of Conservation Commissions.*

- ❖ An annual Coastal Conference should be developed by the Office of Coastal Zone Management, in cooperation with other appropriate state agencies, nonprofits and professional organizations, to provide coastal managers and members of the public with a forum for the exchange of knowledge, ideas, and experiences to prevent and address coastal hazards.

PROTECTION

I. TECHNICAL ADVISORY COMMITTEE TO ASSESS INNOVATIVE EROSION CONTROL AND STORM DAMAGE MITIGATION APPROACHES

A. *Increasingly, coastal property owners, engineers, and manufacturers are advocating for coastal protection approaches that incorporate the use of "new and innovative" protection alternatives. Lack of actual performance and impact data coupled with difficulties fitting such proposals into the existing regulatory framework often makes permitting difficult. Other states have established processes for reviewing innovative erosion control projects and may serve as models for Massachusetts.*

- ❖ Massachusetts should establish a Technical Advisory Committee, consisting of a broad range of qualified professionals, to evaluate and develop construction and monitoring guidance, and recommend appropriate approval conditions for those protection approaches determined to be new and innovative.

II. REGIONAL SAND MANAGEMENT

A. *Extensive armoring and alteration of the Commonwealth's shorelines has, over time, contributed to a significant reduction in the amount of source sediment available to natural sand sharing systems resulting in increased erosion of beaches, dunes and barrier beaches, increasing vulnerability to the natural and built environment from coastal storms and flooding. With accelerating erosion rates and sea level rise predicted to accelerate, regional sediment management will become even more important in the very near future. At the present time, sediment budget data that quantifies sources and sinks of sediment along the coast of Massachusetts are completely lacking. In order to better manage our beaches for environmental and economic benefits, sediment budgets and regional sediment management are essential. Additionally, a guidance document is needed to facilitate the siting and review of projects that balance the need for acquisition of clean, compatible sediment for beach nourishment with the legitimate interests of resource agencies.*

Sand dredged from tidal inlets leading into harbors on Cape Cod is routinely pumped onto nearby eroding public beaches. However, this practice of beneficial re-use of dredged sand is not routinely carried out in other regions of MA. In particular, USACE uses the policy of "the least costly, environmentally acceptable dredged disposal alternative." This usually means nearshore disposal, not beach placement. Early coordination with the USACE and a dedicated fund to supplement their least costly alternative is necessary to get dredged sand pumped onto nearby beaches.

- ❖ <u>The Commonwealth, through its policies, regulations, and activities, should implement a program of regional sand management that promotes nourishment as the preferred alternative for coastal hazard protection. Effective implementation of such an approach should be grounded in the four actions recommended below.</u>

    1. <u>Beneficial Re-use of Dredged Material:</u> Using existing or newly enacted policies and/or regulations, develop a process that (1) improves coordination between the United States Army Corps of Engineers, state agencies, and municipalities, (2) identifies cost-share funds, and (3) achieves permit requirements in a timely manner, so as to ensure that all dredged material suitable for beach nourishment will be placed on adjacent or nearby eroding public beaches.

    2. <u>Regional Sand Management Study:</u> Conduct a regional sand management study that identifies (1) critically eroding public beaches where access is open to the public (2) areas most vulnerable to coastal hazards, and (3) potential regional nourishment methodology and costs.

3. Sediment Source Study for Beach and Dune Nourishment: Building upon the state's current seafloor and habitat mapping initiatives, conduct a study that identifies and maps potential marine (offshore) and inland sources of suitable nourishment sediment.

4. Guidelines for Offshore Sand and Gravel Mining: Update existing DRAFT document entitled *Assessing Potential Environmental Impacts of Offshore Sand and Gravel Mining for the Purposes of Beach Nourishment* to include contemporary state of knowledge regarding the potential short and long-term physical and biological impacts associated with offshore sediment removal.

III. Prioritizing Public Shoreline Protection Projects

A. *Often during benefit-cost analyses for shoreline protection projects, environmental resources are undervalued or not considered at all. The current decision-making framework to prioritize funding of public shoreline protection projects could significantly benefit from an improved benefit-cost analysis that includes natural resources values, and economic data on the value of beaches to the Commonwealth.*

- Massachusetts should build upon an ongoing study by the Cape Cod Cooperative Extension and Woods Hole Sea Grant to quantify the inherent values of Cape Cod coastal beaches for storm damage protection, recreation, and wildlife habitat to develop similar values for all Massachusetts beaches. The results of these studies will allow for a comparative evaluation for competitive funding of public projects.

- Using an approach adapted from that used by the United States Army Corps of Engineers to justify projects, the state should develop a standardized Benefit-Cost Analysis model that fully compares the capital, societal, and natural resource benefits and costs of proposed shoreline protection projects and appropriate alternatives.

20-Year Infrastructure Plan

I. 20-Year Capital Plan for Coastal Infrastructure

- *Recommendations to follow completion of South Shore coastal infrastructure inventory and assessment.*

ACRONYMS AND ABBREVIATIONS

A-zone	Special Flood Hazard Area
CPA	Community Preservation Act
CRS	Community Rating System
CZM	Office of Coastal Zone Management
DOI	Division of Insurance
EOEA	Executive Office of Environmental Affairs
FAIR	Fair Access to Insurance Requirements
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
GIS	Geographic Information System
LIDAR	Light Detection and Ranging
LSCSF	Land Subject to Coastal Storm Flowage
MassDEP	Massachusetts Department of Environmental Protection
MIFF	Massachusetts Insurers Insolvency Fund
MPIUA	Massachusetts Property Insurance Underwriting Association
NFIP	National Flood Insurance Program
NOAA	National Oceanic and Atmospheric Administration
RVAM	Risk and Vulnerability Assessment Map
Storm Team	Massachusetts Rapid Response Coastal Storm Damage Assessment Team
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey
V-zone	Coastal High Hazard Area